

HOW TO BUY A MICRO

How to use the buyers guide to help you choose a computer system for your home or business.

Deciding to buy a micro is the easy part, deciding which micro to buy is where your problems start. Micro computers vary in price from \$100 for the cheapest home machine to over \$20,000 for top-range business machines, so there is plenty of opportunity to waste your hard-earned cash.

The first step in choosing a computer is to state as clearly as possible why you want one. Be honest, as you could make an expensive mistake if you are not.

Computers can be divided into two types, though the dividing line is somewhat ambiguous. The main difference between home and business micros is in the medium used to store data or programs for future use. Home micros use the humble audio cassette, and you will actually have to buy a cheap cassette recorder for this purpose. Though the medium is cheap and readily available it is a very slow method of accessing data; witness the fact that it can take more than five minutes to load your favourite game from cassette into your micro. Business computers use floppy disks to store data, and the disk drive is usually built into the computer. These are more expensive but allow far faster access to data anywhere on the disk.

Computing

Home computers form the cheaper group, generally costing under \$1000. By far the majority of home micro owners use their computers to play games, available in cassette form for around \$20 to \$25, but there are other valid uses! Computers are finding their way into schools more and more these days, but unfortunately most educational software is of a very poor standard.

Another good reason to buy a home computer is simply to learn about computing, with a view to learning how to write your own programs for fun or profit.

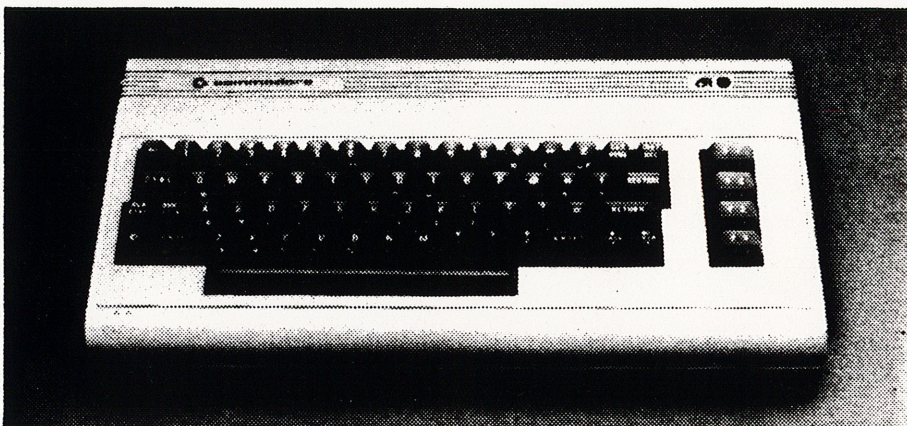
However there are many misconceptions about using your computer at home. It is usually far quicker to do your home finances with old-fashioned pen and paper than on a micro, and you will find it far easier to use a cookery book than try and store your favourite recipes on it.

Business micros start at around \$1500 and extend upwards, though there are a few cheaper models around. The majority of business machines come complete with one or two floppy disk drives and a monochrome monitor, which is one reason why they tend to be more expensive than home machines! Business micros come into their own in applications that require speedy access and manipulation of large amounts of

machine round the corner, and when it does come out the chances are it won't be half as wonderful as they promised! It is better to go for something that has a good track record, and plenty of software readily available.

Home Micros

The specifications to look for when choosing a home micro depend very



data. They can replace filing cabinets, keep your accounts, deal with large mail-outs and the like. Indeed spreadsheets, databases, accounts packages and word processors make up a large part of the software available for business micros. However there are plenty of more specialised applications, and programs exist to cater for the needs of newsagents, builders, farmers and many others.

However, many of the more powerful home machines can be expanded into quite respectable business systems by purchasing add-on disk drives, monitors and printers. Quite a few small businesses make good use of, say, the Commodore 64 to keep track of stock or accounts, though it is arguable that it may have been more cost-effective if they had bought a business micro in the first place.

So the answer is to take account of your future requirements as well as your immediate needs. Finally, beware of promised 'super' machines that the manufacturers haven't quite got round to making yet. It is tempting to wait for the next generation of micros, but remember that there will always be a new wonder

much on your intended use.

If you are looking for a games machine then your primary concern has to be the quantity and quality of software available for that particular model. Games written for one model will not usually work on another.

If you are looking for a home machine that is easily expandable then you should look at the type of interfaces supplied. These are the various standard plugs and sockets needed to allow computers to 'talk' to other components. Centronics is a one-way interface allowing the computer to output data only. Most printers use the Centronics interface, so if you intend to get a printer make sure the computer you buy has a Centronics port. The RS232 interface is more complex, as it is two-way, allowing the computer to receive information from the outside world as well as talking to it. It can be used with printers, but you usually have to pay extra for the privilege. RS232 is primarily used to connect one computer to another, so they can communicate and share data.

Certain manufacturers, most notably Commodore have their own standard

expansion interface, which connects to their own range of printers, disk drives and other add-ons.

Most home computers use a standard domestic television for the display. A good colour television can give very respectable results, but for serious work you will soon be tempted to invest in a monitor. This is particularly true with serious word processing where you need to be able to display 80 columns of type on the screen, as domestic televisions are just not capable of this sort of resolution. A monitor requires a monitor output, and there are a variety of formats.

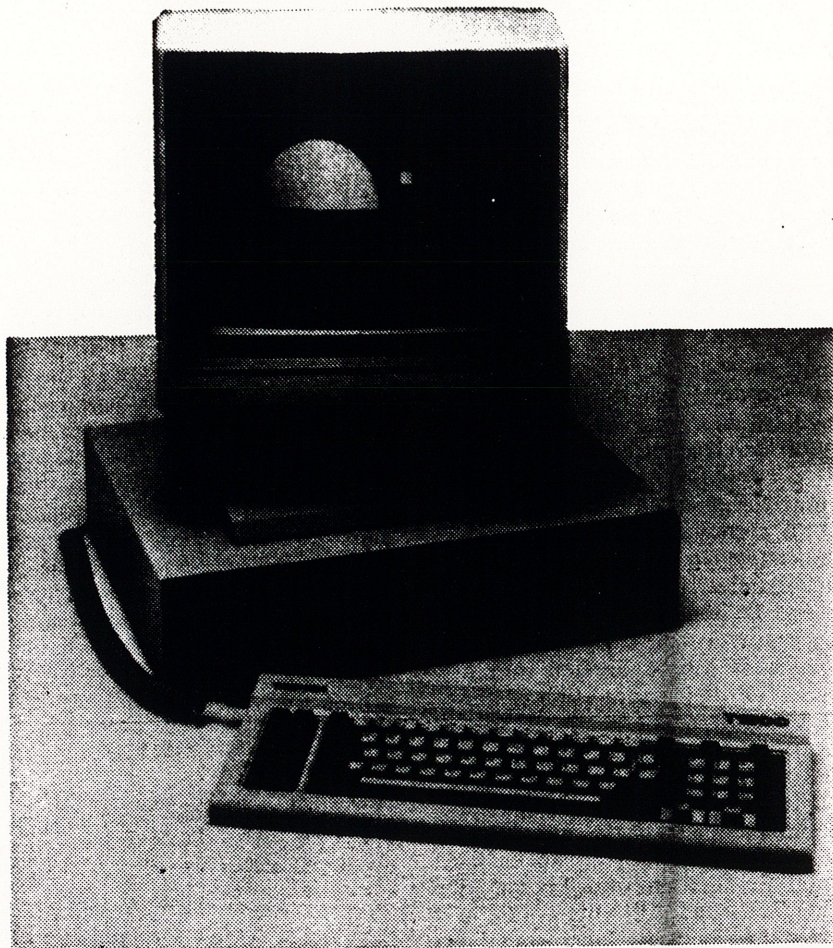
Memory is important. Programs, whether bought in cassette form or typed in yourself, take up memory, or RAM, as it is known in the trade. The more memory there is the longer and more interesting the programs the computer can handle. Advertisers make much of memory capacity, quoting '64k', '32k' from all directions. However this is not quite what it seems, as most computers use a substantial amount of RAM for the screen display and other internal purposes, leaving substantially less for your own use. High resolution, multi-coloured graphics are particularly demanding, so if you are concerned about memory make sure you are comparing 'user-available RAM', and not simply the quoted figures. High resolution graphics are all very well, but most televisions are unable to resolve much above 320 x 256 so anything higher is wasted without a monitor.

Finally, look at the Basic, the language that the computer uses, and the keyboard. The quality of the Basic is only relevant if you intend to write your own programs, but there are a horrific number of different 'dialects'.

Business Micros

The secret to buying a business micro is in the software. It is the software that tells it what you want it to do, so it is with the software that your decisions should start. The first step is to specify on paper as fully as possible the jobs you want the computer to do and the amount and type of data you want it to handle.

You will soon come across terms like 'CP/M compatible' or 'for MS-DOS' as



you investigate software. CP/M and MS-DOS are two disk operating systems in common use over a wide range of computers. Unfortunately the compatibility of CP/M or MS-DOS systems between machines depends on the type and capacity of the disk drives, so CP/M software for, say, a Kaypro is unlikely to run on an Epson. The IBM PC and the Apple II have become standards, and when a micro is described as, say, 'IBM compatible' it means that it should run all the software written for the IBM PC. But do check this before committing yourself!

Now we come to the hardware itself. There are several types of storage medium: the average floppy disk is capable of storing around 350 kilobytes, which is roughly equivalent to 60,000 English words, or about 60 pages of PCG. Some micros are capable of storing up to 1Mbyte (1,000k) per disk, but if your demands are more you will need to go for a hard disk or Winchester. These can store anything up to 20Mbyte, but at a substantial extra cost.

A big advertising point at present is whether the machine is 8-bit or 16-bit, 16-bit being supposedly faster and better. The difference in speed between the two is unlikely to be noticeable. The CP/M operating system was designed for 8-bit words, while MS-DOS is 16-bit, but most

modern business micros tend to be 16-bit, though some are capable of running both.

The keyboard and screen are important. Make sure you are comfortable with both, particularly the keyboard. Some micros have a large number of 'function' keys, keys which do nothing in themselves, but can be programmed to carry out complex functions at a single keystroke. These are very useful for complex wordprocessors and databases.

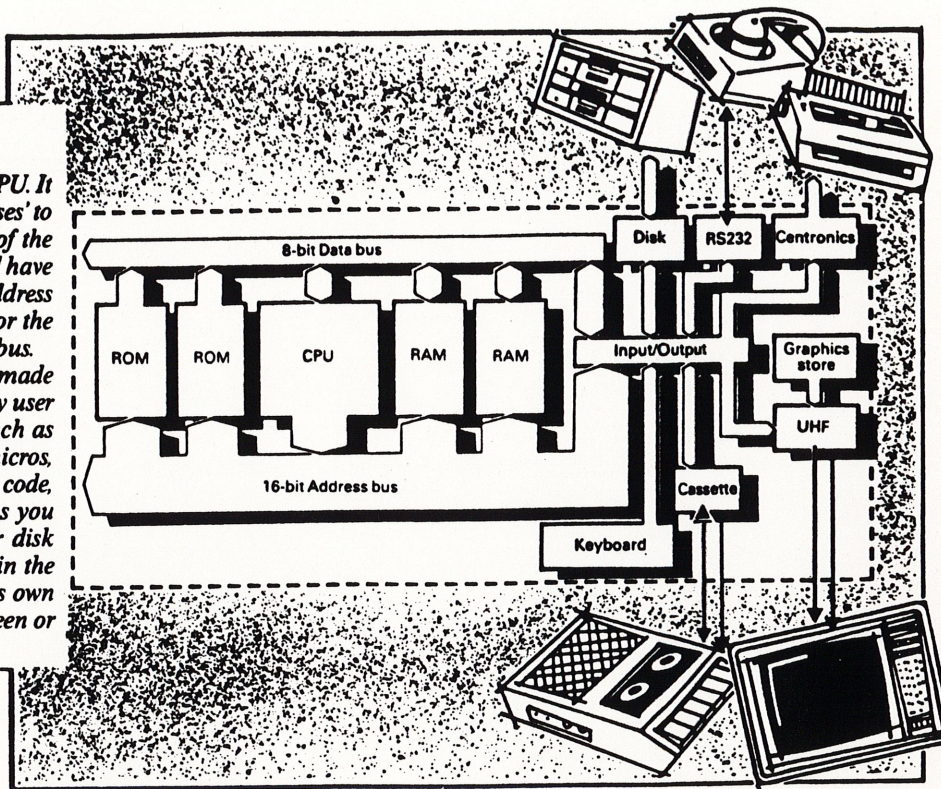
Finally, there are alternatives to the usual three-box business micro. There are several so called 'portable' micros, with screen built in, though they are heavy enough to cause hernias! Hand-held computers are becoming very popular as electronic notebooks, and can be linked back to your office computer from anywhere in the country, via modem. At the other end of the market are the multi-user systems, which allow several people with their own keyboard and screen to use the same database and share information. These are expensive if you only have two or three users, but if you are likely to expand they could well become cost effective.

Buying a micro is a costly and time consuming process. These tables can help you compare different models, but a good dealer is vital if you are to make the right decision.

Inside your Micro

The heart of your micro computer is the microprocessor, or CPU. It is here that instructions are carried out. It is linked by two 'buses' to the computer's memory and the outside world. Every part of the memory and the components that deal with the outside world have a unique 'address'. By sending out an address along the address bus the CPU can call or send data to or from the memory or the input and output device. This data travels along the data bus.

The CPU itself talks in a language called 'machine code', made up of binary numbers. It is a very fast language but is not very user friendly, so we find it easier to use a high-level language such as Basic. This is by far the most common language on home micros, and the translating program, that converts Basic to machine code, is stored in the ROM so it cannot be altered. Any programs you enter, either directly by keyboard, via the cassette deck or disk drive, or even sent by telephone via the modem, are stored in the RAM. However the computer itself also uses the RAM for its own purposes, in particular to store the data required for the screen or TV display.



KEY TO HOME MICROS

Hardware

MAKE AND MODEL: The micros are listed in order of price.

PRICE: Includes tax.

CPU TYPE AND SPEED: Indicates the type of micro processor used and the clock rate.

Memory

STANDARD RAM: Amount of memory in k (1 kilobyte equals 1024 bytes). RAM that is dedicated to the screen display is included.

MEMORY EXPANSION: The amount of extra memory available and the price of the expansion.

MEMORY FOR BASIC: The amount of memory that is available to you when programming in Basic.

Graphics

Many home micros allow several 'modes' of graphics display to overcome their limited memory. A high resolution display usually goes hand in hand with a limited range of colours and little memory left over for Basic. A lower resolution allows more colours on the screen and more memory for your program. The tables lists the parameters for the highest resolution mode on top and the lowest resolution mode below.

GRAPHIC RESOLUTION: The number of points across and down that can be accessed individually.

COLOURS: The number that can be displayed at the same time, though they may be from

a larger palette.

TEXT FORMAT: Number of characters that can be displayed across and down the screen. Eighty-character lines are needed for serious wordprocessing.

SPRITES: These useful programming tools enable you to move graphic designs easily around the screen. The maximum number available is shown.

USER-DEFINED GRAPHICS: Means you can redefine some of the keys on the keyboard to your own graphic motifs.

Keyboard

KEYBOARD TYPE: An F means a full typewriter keyboard, while C is a rubber pad calculator-type.

NUMERIC KEYPAD: This is a set of numeric keys grouped together.

FUNCTION KEYS: This is the number of keys that can be programmed to perform useful functions.

Basic

BASIC: An entry of BBC means BBC Basic, while MSX indicates the Basic conforms to the MSX standard. Otherwise a star rating out of three is given.

KEYWORDS: Indicates that a single keystroke enters a whole Basic command.

EDITOR: There are two types of Basic editor: is the more flexible and allows you to edit your programs anywhere on the screen. I means you must select a line of your program into an editing area and alter it there.

Sound

NO. OF CHANNELS: This is the number of separate sounds that can be individually controlled.

ENVELOPE: Indicates that the amplitude of the sound can be fully controlled by an ADSR envelope.

Interfaces

CASSETTE: A cassette deck is usually required to store your programs. A ● indicates the player is built in, \$ that you have to buy one (but any will do), and Ø indicates that the micro will use only its own-brand player.

DISK: Means that there is an interface to a disk drive built-in, \$ means there is an interface but it costs extra.

RS232: The standard serial interface used for communications, though some printers have optional RS232 interfaces. A \$ means that it costs extra.

JOYSTICK: A ● indicates that the micro takes the near-standard Atari-type joystick, Ø indicates a different type of joystick.

MONITOR: Interfaces to monitors, which will give you a far clearer display than the home TV, come in two flavours: R indicates RGB and C composite.

EXPANSION: If a particular expansion interface is necessary.

Comments

BUSINESS EXPANSION: Many home micros can be expanded to a full business system.

HOME MICROS

| Hardware | | Memory | | | Graphics | | | Keyboard | | | Disk | | | Sound | | | Interfaces | | | Comments | | | | | | | | | | |
|----------------------------------|---------|----------------|--------------|--------------------|-----------------|--------------------|-------------------|---------------------|---------|-----------------------|---------------|----------------|---------------|-------|----------|--------|-----------------|----------|----------|----------|------------|-------|----------|---------|-----------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------|-----------------------------------------------------------|--------------------------------------|
| Make and Model | Price | CPU type Speed | Standard RAM | Memory Expansion | Memory for Disk | Graphic resolution | Colours on screen | Text format Max/min | Sprites | User defined graphics | Keyboard type | Numeric keypad | Function keys | Disk | Keywords | Editor | No. of channels | Envelope | Cassette | Disk | Centronics | RS232 | Joystick | Monitor | Expansion | Business Expansion | Software Available | Verdict | Supplier | |
| VC-300 | \$999 | Z80 3.5MHz | 16K | 16K/ 64K/50 | 16K | 128x64 64x32 | 9 | 32x16 | | F | F | | | | | C | 1 | | | | | | | | C | Disk drive | | Unlimited range of software | Disk machine | Disk South Electronics (02) 888 3200 |
| Commodore 16 | \$1499 | 7501 1MHz | 16K | | 2K | 320x200 | 12 | 40x25 | | F | F | | | | | C | 2 | | | | | | | | C | Expansion port for Commodore add-ons | | Unlimited | Comes with cassette disk and two games. | Commodore (02) 427 4888 |
| Trudy TR-80 Color Computer | \$1800 | 6800 1MHz | 16K | 32K/ 64K/ | 14K | 256x182 | 8 | 32x16 | | F | F | | | | | C | 1 | | | | | | | | C | Good range of own brand add-ons | | Lots of educational software and good W/P | Disk machine. Extra RAM/Trudy includes standard Basic | Disk South Electronics (02) 875 1222 |
| Commodore Plus/4 | \$3499 | 7810 1MHz | 64K | | 50K | 320x200 | 16 | 40x25 | | F | F | | | | | C | 2 | | | | | | | | C | Own serial interface | | Little to date | Disk machine. Extra RAM/Trudy includes standard Basic | Disk South Electronics (02) 427 4888 |
| Standard 22 System Plus | \$3999 | Z80 3.5MHz | 48K | | 38K | 256x176 | 16 | 32x24 | | F | F | | | | | C | 1 | | | | | | | | C | Wide range of independent add-ons | | Excellent range for education and games | Great way of getting into micros. DL style keyboard | TTA (02) 408 5533 |
| Speidel 96-728 | \$3999 | Z80A 3.5MHz | 64K | 64K/320K up to 1MB | 28K | 256x182 68x48 | 16 | 40x24 | 32 | F | F | | | | | C | 3 | | | | | | | | C | Disk, MSX cartridge ports, graphics tablet | | Unlimited range of good games. CP/M programs available. | Fall MSX micro | Reco Music (03) 688 2388 |
| Commodore 64 | \$4999 | 6510 1MHz | 64K | | 38K | 320x200 | 16 | 40x25 | 8 | F | F | | | | | C | 4 | | | | | | | | C | Own base for ROM ports | | Excellent range-games and business. | Fall Basic. Price includes cassette disk and two games. | Commodore (02) 427 4888 |
| Model 805 | \$4999 | Z80A 3.375MHz | 32K | | 31K | 512x242 128x48 | | 80x24 64x16 | | F | F | | | | | L | 1 | | | | | | | | C | Upgrade to Computer-80 Basic, or 128K model. Colour option (\$135), and sound (3 channel) \$120. | | Mainly educational and games | Disk but can upgrade. | Applied Technology (043) 242 711 |
| Sony M875 | \$4499 | Z80 4MHz | 80K | | 28K | 256x182 | 16 | 40x24 | 32 | F | F | | | | | L | 3 | | | | | | | | C | MSX cartridge port | | Little to date — will be soon seen | Fall MSX specification micro | Sony (02) 887 8888 |
| Toshiba M810 | \$4499 | Z80 4MHz | 80K | | 28K | 256x182 | 16 | 40x24 | 32 | F | F | | | | | L | 3 | | | | | | | | C | MSX cartridge port | | Little to date — will be soon seen | Fall MSX specification micro, probably the cheapest. | Toshiba (02) 887 3322 |
| Amstrad CPC 464 | \$5279 | Z80 4MHz | 64K | | 42K | 640x200 160x200 | 2 | 80x25 20x25 | | F | F | | | | | C | 4 | | | | | | | | | | Good quality and more at the time | Comes with monitor and cassette. Colour monitor version \$629 | AMA Team (02) 638 8444 | |
| Commodore C128 | \$6499 | Z80 8MHz | 128K | | 112K | 320x200 | 16 | 40x25 | 8 | F | F | | | | | C | 3 | | | | | | | | C | First disk drive with CP/M for \$499 | | Runs CP/M mode and Commodore 64 | Good buy, if a little expensive. | Commodore (02) 427 4888 |
| Standard 68 | \$3799 | 68008 7MHz | 128K | | 82K | 512x256 | 8 | 85x25 | | F | F | | | | | C | 1 | | | | | | | | C | Own serial ports | | Supplied with 4 Fusion business packages | Microtronic not present yet. | TTA (02) 408 5533 |
| Amstrad CPC 6128 | \$8800 | Z80 4MHz | 128K | | 108K | 640x200 160x200 | 2 | 80x25 20x25 | | F | F | | | | | C | 4 | | | | | | | | | | Upgraded to 128K model. Colour option (\$135), and sound (3 channel) \$120 | Comes with monitor and disk drive. Colour monitor version \$1000 | AMA Team (02) 638 8444 | |
| Model 805 Computer-80 | \$995 | Z80A 3.375MHz | 64K | | 31K | 512x242 128x48 | | 80x24 64x16 | | F | F | | | | | L | 1 | | | | | | | | C | CP/M included | | CP/M included with disk system | Expansion but good. | Applied Technology (043) 242 711 |
| Speidel 96-728 | \$9999 | Z80A 3.5MHz | 64K | 64K/320K up to 1MB | 28K | 256x182 68x48 | 16 | 40x24 | 32 | F | F | | | | | C | 3 | | | | | | | | C | Disk drive, MSX cartridge port | | Dual disk, MSX | Fall MSX micro | Reco Music (03) 688 2388 |
| Amstrad CPC Model 87+ | \$13002 | 6802 2MHz | 64K | | 28K | 160x256 640x256 | 8 | 20x22 80x22 | | F | F | | | | | C | 3 | | | | | | | | C | Time, 4A-D channels. Disk, User port etc. | | Compatible with all BBC | Expanded BBC, but still overpriced includes disk machine. | Barcon Computers (02) 888 9444 |
| Model 128K Small Business System | \$1995 | Z80A 3.375MHz | 128K | | 31K | 512x242 128x48 | | 80x24 64x16 | | F | F | | | | | L | 1 | | | | | | | | C | Time, 4A-D channels. Disk, User port etc. | | AI CP/M software | Good machine for serious home use or small business. | Applied Technology (043) 242 711 |